

A Vision for Science Education in Michigan



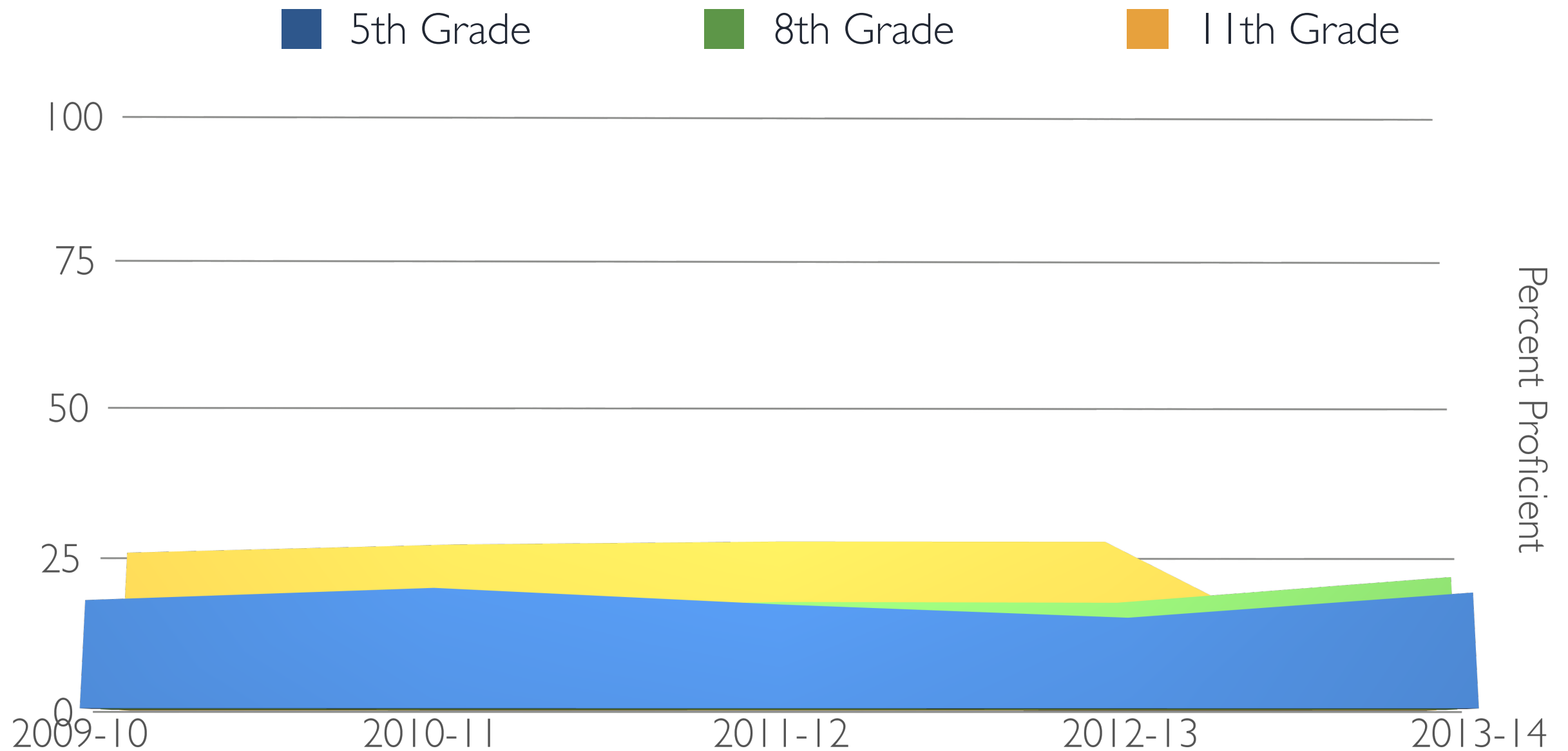
OBJECTIVES

- Provide a potential vision of what science education could look like throughout the state.
- Address the potential for engaging science instruction to meet the state's mission of having every child career and college ready.
- Highlight components of science education that will need focus.



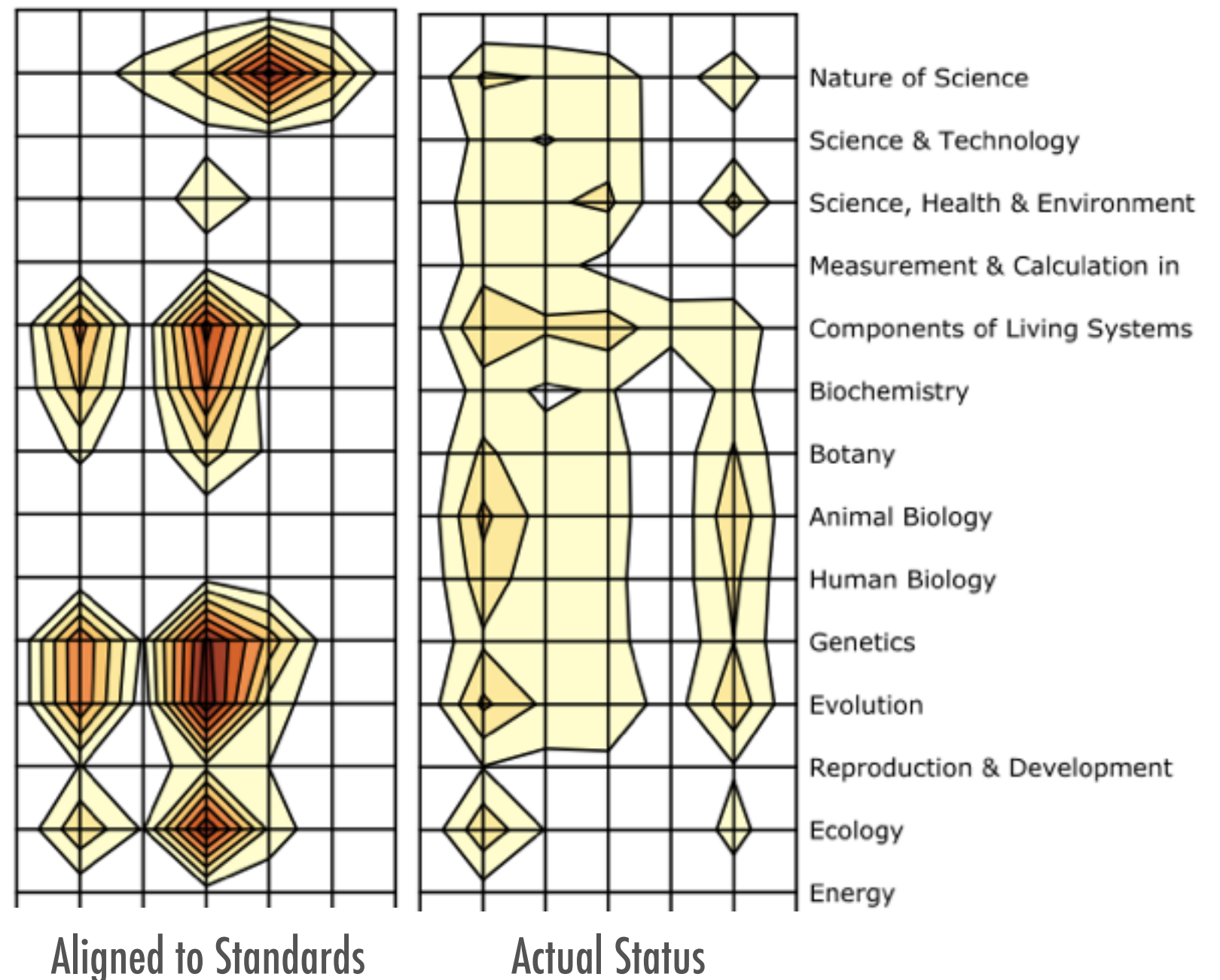
WHERE ARE WE TODAY?

Statewide Proficiency in Science

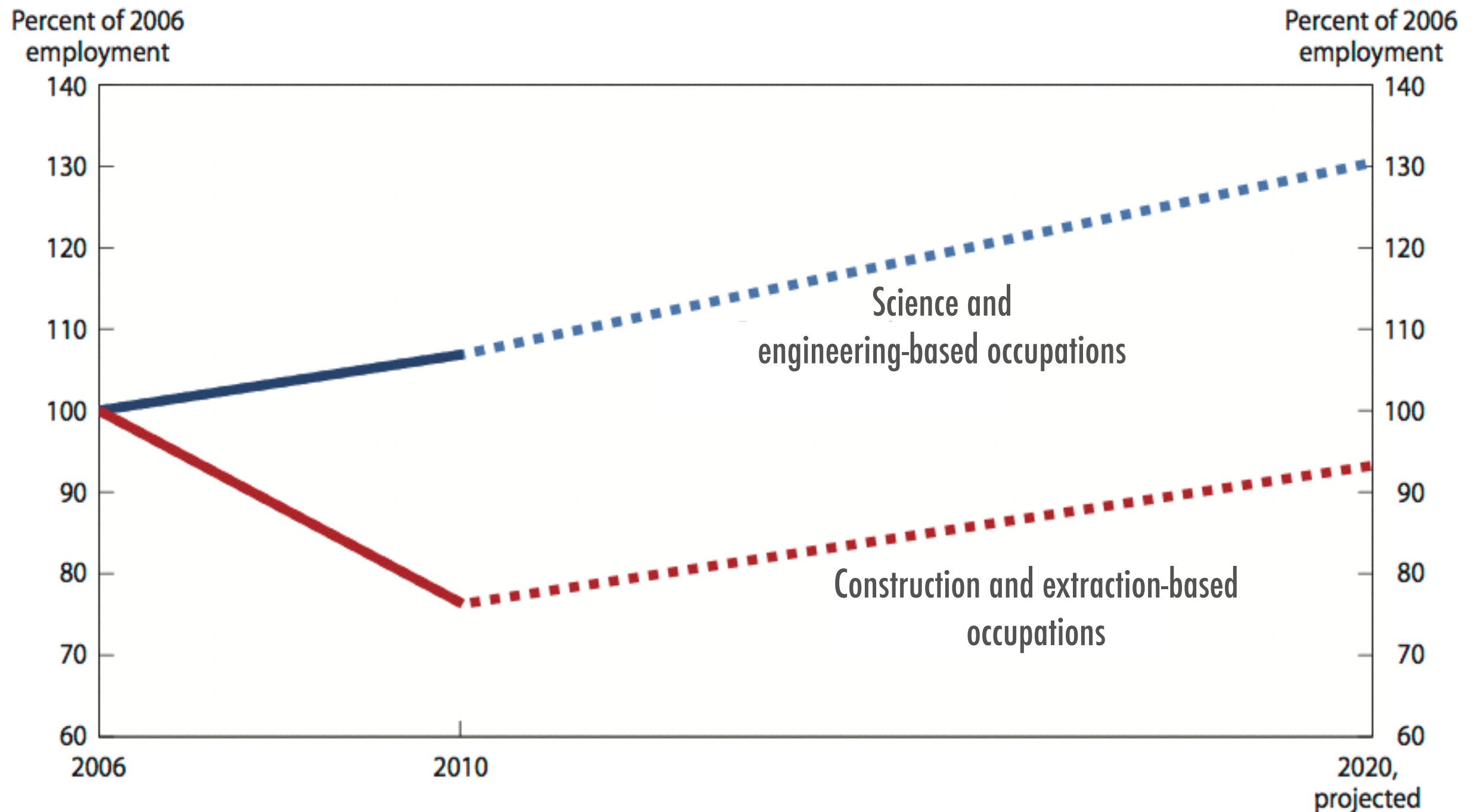


WHAT IS HAPPENING IN CLASSROOMS TODAY?

- Content is addressed as information, including “legacy topics”
- Analysis and understanding are skimmed over - breadth vs depth
- General lack of engagement or investigation of ideas



WHAT DO WE NEED?

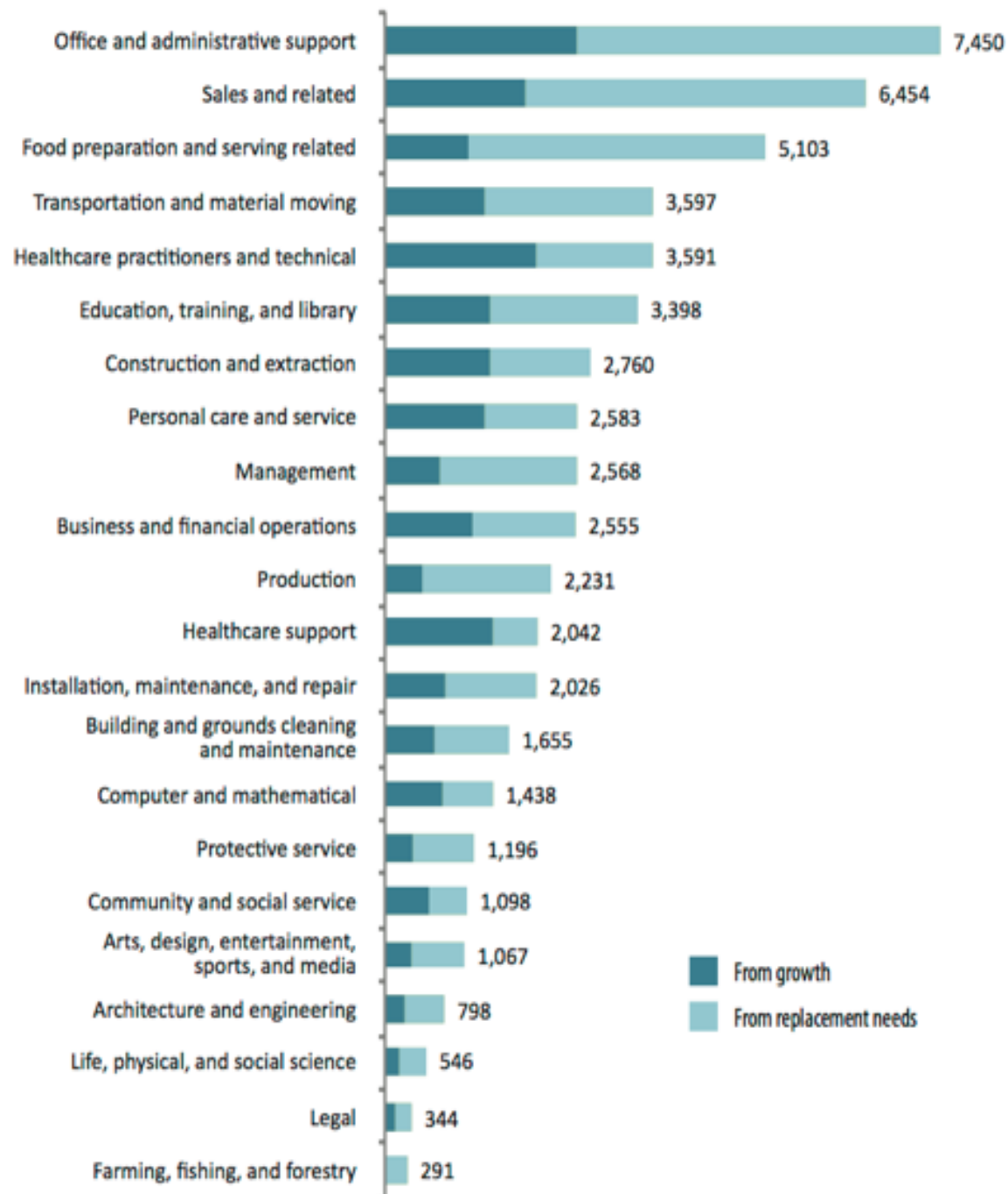


NOTE: BLS does not project specific data for each of the years between 2010 and 2020. Interim years to the 2020 projection point are expressed by a dashed straight line only.

SOURCE: U.S. Bureau of Labor Statistics.

WHAT DO WE NEED?

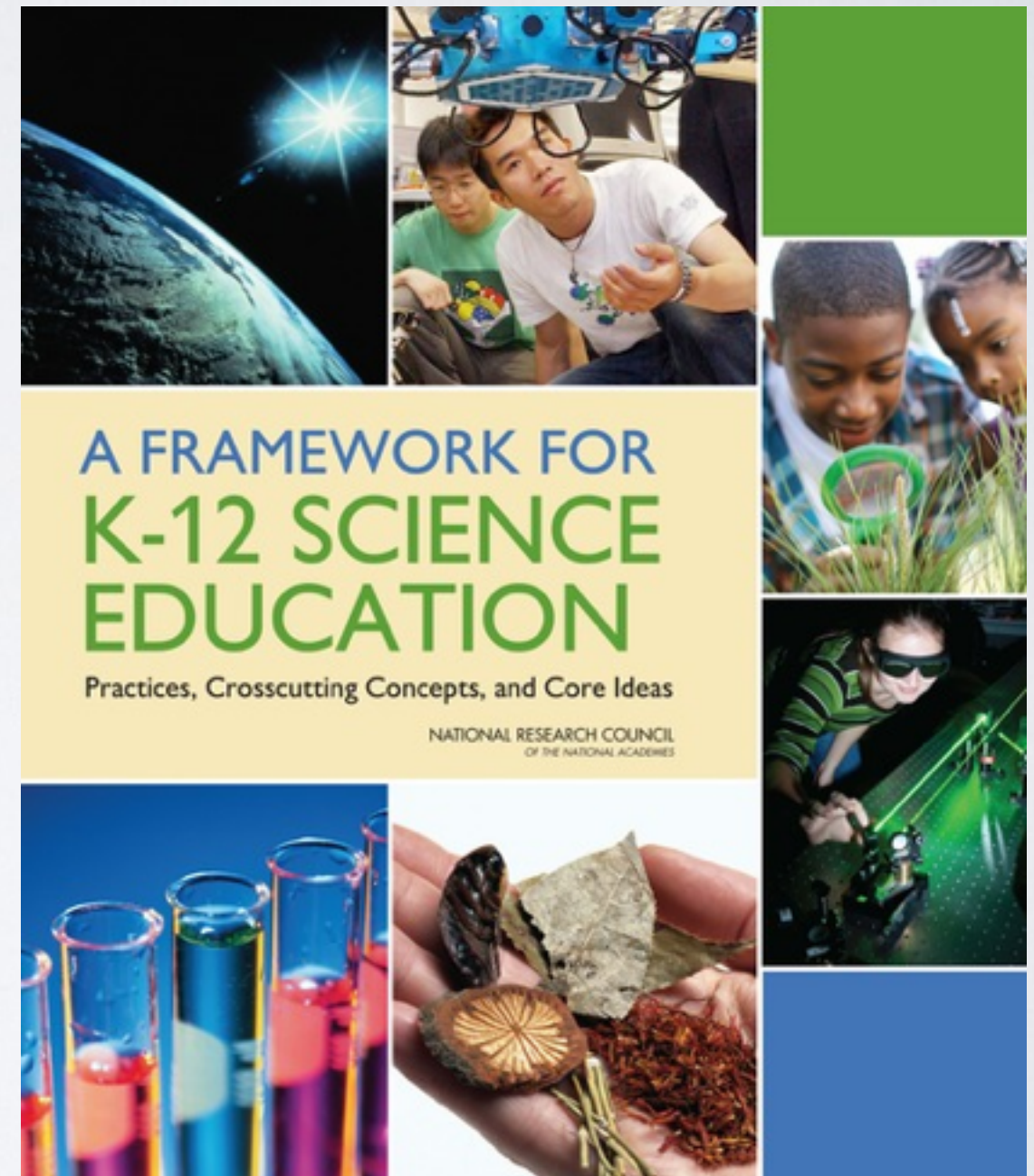
Job openings by major occupational group, projected 2010–20, in thousands of openings



- Job information for STEM
- Needs for science literacy
- Innovations

WHAT WORKS?

- Research on science education
- Input from business, industry, and higher education
- Examination of current status and nostalgic policies that are detrimental to desired outcomes





WHEN (AND HOW)
DO WE START?



ELEMENTARY SCHOOL: THINKING AND ACTING LIKE SCIENTISTS



Crested Geckos

Fun Fact
they have hair on their feet to help them climb


Food
Crested geckos eat crickets dusted with calcium powder once a week. They also eat gut loaded crickets.

To gutload crickets, you need to put all the nutrients you want them to eat but they won't in the cricket bin. they will eat it and then the crested will eat the cricket with all the nutrients they need. Make sure you gut load them 1 day before you feed them to N.

fun fact
they don't blink they don't even have eye lids

paige

← we are gut loading them



Isaac
Charlotte

Crested Gecko
Fun Facts
by charlotte

Crested geckos are native to southern grand terre and New caldonea (which are near australia). People thought they were extinct until they rediscovered them in 1994.

They

latin name: rhacodactylus ciliatus

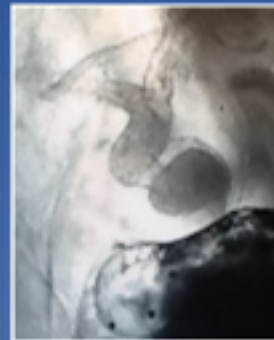
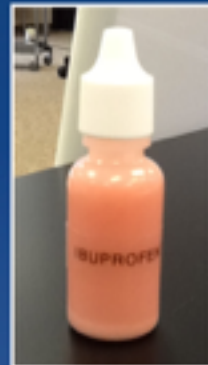
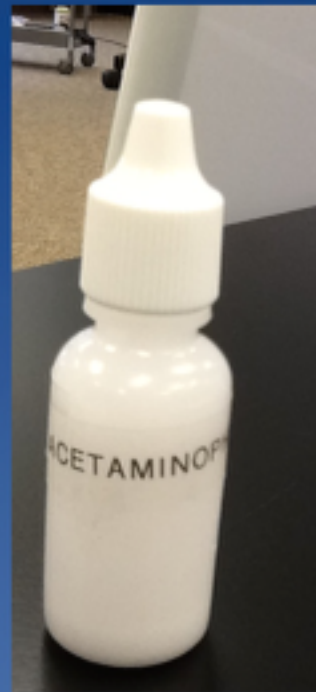
longevity: 10 - 20 years

fun fact
they like their eyelids

Question

How do three different types of painkillers affect the heart rate of the xenopus tadpole?

Observation



Ibuprofen Data Table

Trials	Culture Water	Ibuprofen	Qualitative Data/Notes
1	126 bpm	102 bpm	Very high heart rate
2	102 bpm	114 bpm	Great visual of heart beating
3	84 bpm	84 bpm	Could see blood flowing, hard to see heart
4	84 bpm	84 bpm	
5	72 bpm	78 bpm	Lower heart rate
6	90 bpm	84 bpm	Could see lungs great
7	90 bpm	90 bpm	
8	84 bpm	90 bpm	Could see blood flowing
9	84 bpm	96 bpm	Great visual of heart
10	90 bpm	90 bpm	No change
Average	90.6	91.2	

WHAT DO WE SEE
FROM STUDENTS?

- Predictions
- Sources of Error
- Confidence in results
- Future questions to investigate



Claim: I claim that when introduced to the xenopus tadpole, these painkillers will most likely make the heart rate go up, or it will stay the same, but rarely go down.

Evidence: Almost all of my trials support my claim; they all either stayed the same, or went up. For the example 24/30 trials either went up or stayed the same, and the average of all the trials is 87.2 in water, and 91.8 when the painkiller is introduced.

Reasoning: I did ten trials for each type of medicine, so my investigation was a fair test, and I looked for all potential sources of error, and if there was one, I restarted, so I am strongly confident in my investigation. I had also known from second hand research that these medicines had no known stimulants or depressants, so it wouldn't make much of a difference.

CONNECTING SCIENTIFIC PRACTICES WITH MATH AND ELA SKILLS

Driving Question:
**What is the water
like in our river?**

Where does the
water in our
river come from?

**What happens
when it rains?**

*How does the
water get to the
river?*

*Who depends
on the water?*

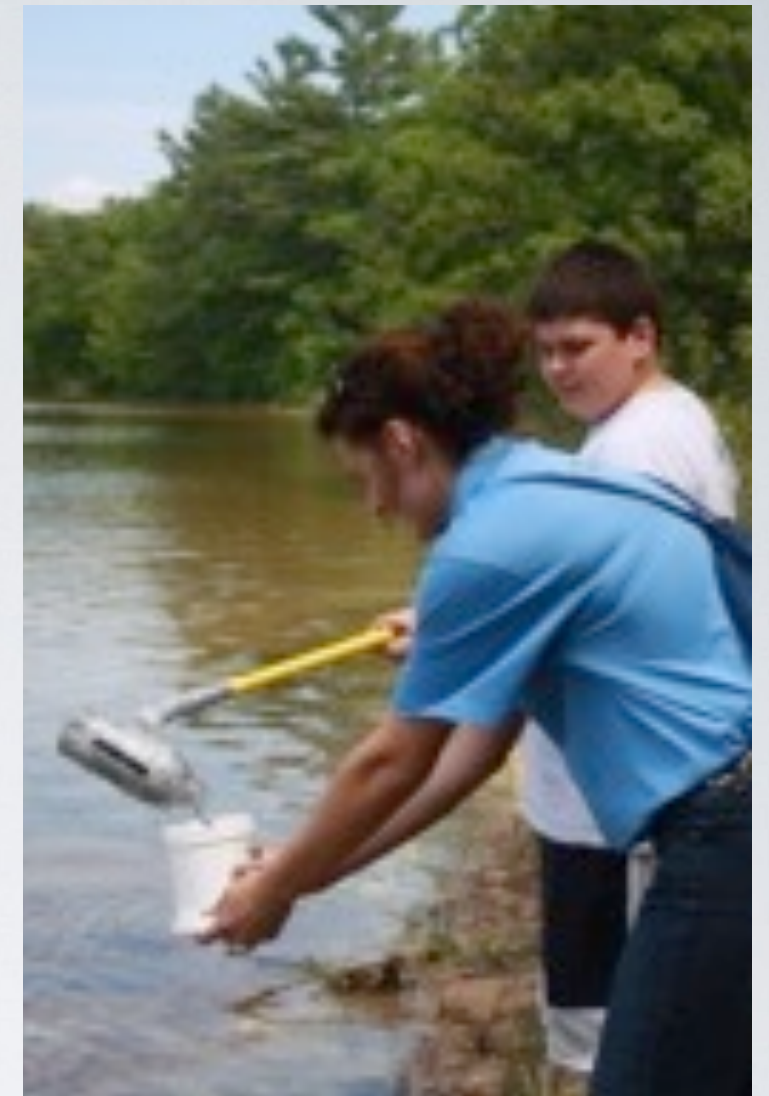
**Is the water
different through
the river?**

What is in the water
in our river?

**What lives in the
river?**

Is our river different
from others?

**Can we drink
the water?**



HOW DO WE ENGAGE LEARNERS
AND DEEPEN UNDERSTANDING?



DEEPENING SCIENTIFIC PRACTICES
THROUGH AUTHENTIC INVESTIGATIONS
AND COLLABORATION



HOW DO WE INTEGRATE THE SCIENCES WITH STEM FIELDS?

PROJECT-BASED LEARNING WITH AUTHENTIC PROBLEMS



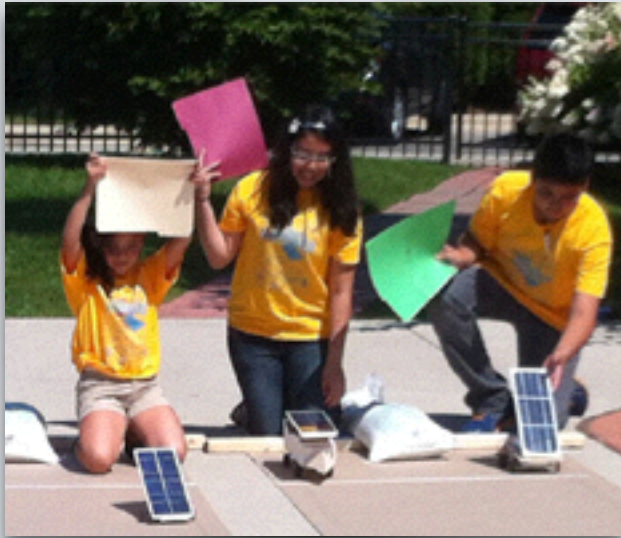
How do we
prevent invasive
species in our
lakes?



How did native
peoples use plants
to sustain
themselves?

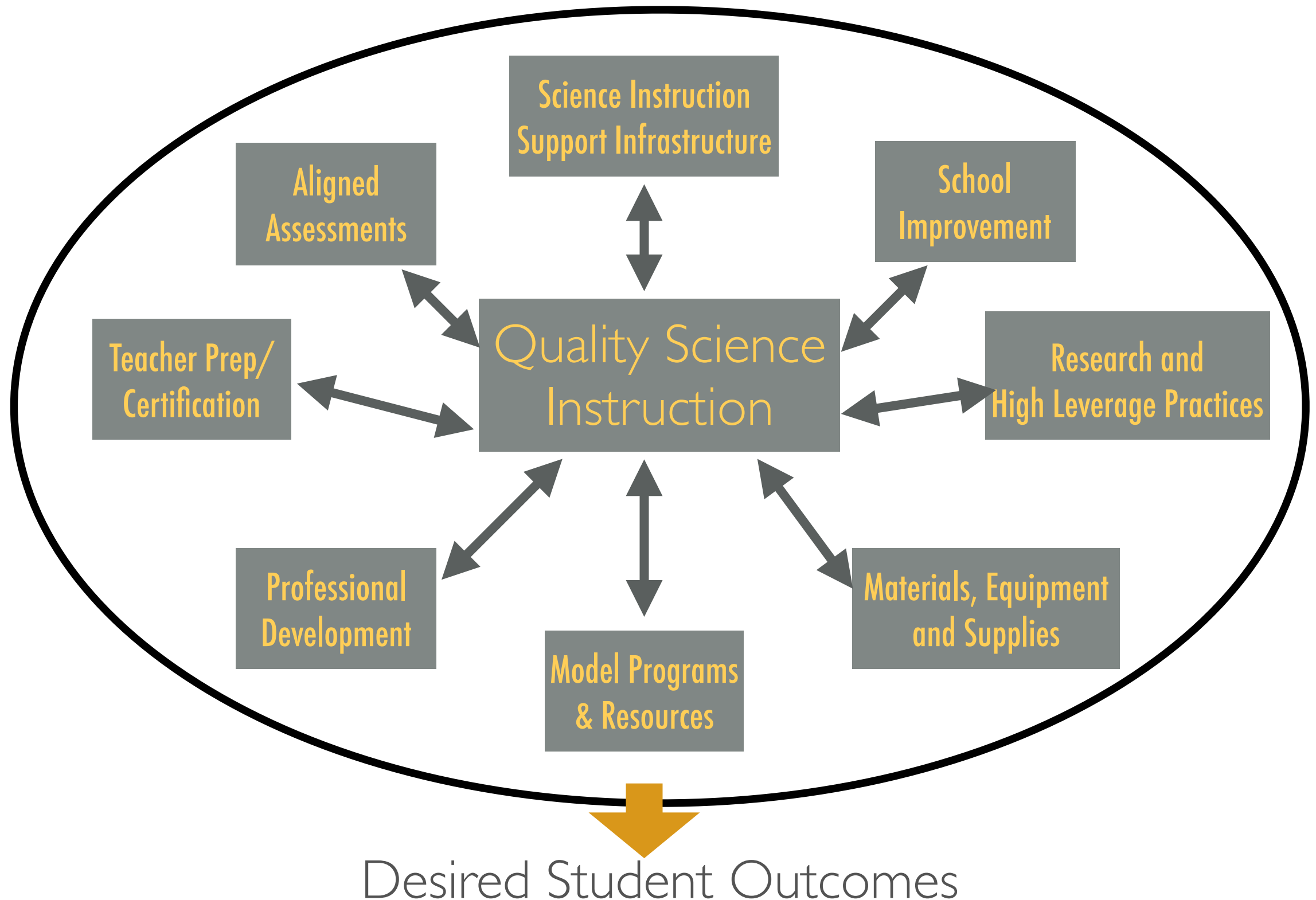


Can we provide
electricity to remote
areas through
renewable energies?



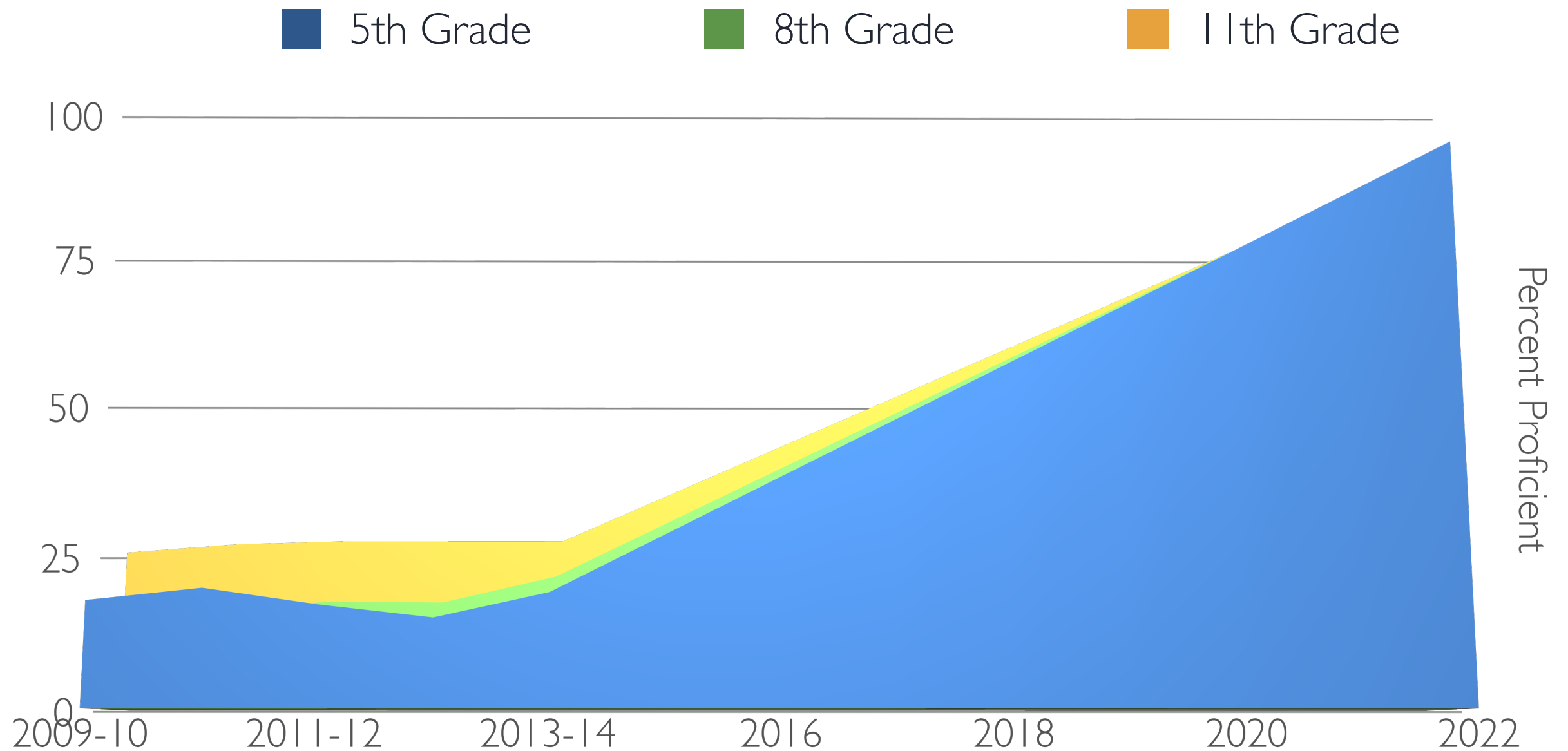
EXPANDING THE SCOPE OF
DESIGN AND INVESTIGATION

ACHIEVING THE VISION



WHERE DO WE WANT TO BE?

Statewide Proficiency in Science



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